

## CLAIMS:

1. A method of detecting a peroxide-based explosive in a sample suspected of consisting of or comprising such explosive, which method comprises  
5 dissolving said sample in a suitable organic solvent, contacting the solution with an aqueous solution of a strong acid capable of decomposing said explosive to release hydrogen peroxide, and contacting the resulting mixture with a peroxidase enzyme, a buffer to adjust the pH to such permitting action of the peroxidase enzyme and a substrate capable of being oxidized by the oxidant  
10 under the catalysis of the peroxidase enzyme to produce a pronounced change in a measurable physical parameter of the substrate.
2. A method according to Claim 1, wherein said physical parameter of the substrate is its colour or colour intensity
- 15 3. A method according to Claim 1 or 2, wherein the solvent is selected from tetrahydrofuran, 1,4-dioxane, lower alkanols, dimethylsulfoxide, N,N-dimethylformamide, carboxylic acids, especially acetic acid and trifluoroacetic acid, and sulfonic acids.
- 20 4. A method according to Claim 3, wherein the organic solvent is acetic acid.
- 25 5. A method according to any one of Claims 1 to 4, wherein the strong acid is selected from  $H_2SO_4$ ,  $HCl$ ,  $HBr$ ,  $HClO_4$ ,  $H_3PO_2$ ,  $H_3PO_3$ ,  $H_3PO_4$  and  $HNO_3$ .
6. A method according to Claim 5, wherein the strong acid is  $H_2SO_4$ .

7. A method according to Claim 6, wherein the concentration of the aqueous  $H_2SO_4$  solution is from about 5% to 95%, preferably from about 10% to about 50% by volume.

8. A method according to any one of Claims 1 to 7, wherein the pH is adjusted by said buffer to about 5.0 to about 9.0.

9. A method according to any one of Claims 1 to 8, wherein the buffer is about 0.01 to 0.5 M citrate/phosphate buffer.

10. A method according to any one of Claims 1 to 9, wherein the peroxidase enzyme is Horseradish peroxidase.

11. A method according to any one of Claims 2 to 10, wherein the substrate is selected from 2,2'-azino-bis(3-ethylbenzthiazoline-6-sulfonic acid) diammonium salt, 2,7-diaminofluorene, 3,3',5,5'-tetramethylbenzidine and its dihydrochloride salt, 5-aminosalicylic acid, o-phenylenediamine and its dihydrochloride salt, 5-amino-2,3-dihydro-1,4-phthalazinedione, 3-amino-9-ethylcarbazole, 4-chloro-1-naphthol, 3,3'-diaminobenzidine, o-dianisidine and its dihydrochloride salt, guaiacol and pyrogallol.

12. A method according to any one of Claims 1 to 11, wherein the sample is introduced into a mixture of the organic solvent and the aqueous solution of the strong acid.

13. A method according to any one of Claims 1 to 12, wherein the peroxidase enzyme is combined with the buffer prior to being contacted with said resulting mixture.

14. A method according to any one of Claims 1 to 12, wherein the buffer is combined with the substrate prior to being contacted with said resulting mixture.

5 15. A method according to any one of Claims 1 to 12, wherein said resulting mixture is contacted with a combination of the buffer, the peroxidase enzyme and the substrate.

10 16. A method of detecting a peroxide-based explosive in a sample suspected of consisting of or comprising such explosive, which method comprises introducing said sample into a mixture of an organic solvent and an aqueous solution of a strong acid capable of decomposing said explosive to release hydrogen peroxide, and contacting the resulting mixture with a solution comprising a peroxidase enzyme, a buffer to adjust the pH to such permitting  
15 action of the peroxidase enzyme and a substrate capable of being oxidized by the oxidant under the catalysis of the peroxidase enzyme to produce a pronounced change in the colour of the substrate or its colour intensity.

20 17. A method according to Claim 16, wherein the organic solvent is acetic acid.

18. A method according to Claims 16 or 17, wherein the strong acid is aqueous sulfuric acid.

25 19. A method according to any one of Claims 16 to 18, wherein the peroxidase enzyme is Horseradish peroxidase.

20. A kit for use in the method of Claim 1, comprising packaged organic solvent, packaged aqueous solution of a strong acid, packaged buffer, packaged peroxidase enzyme and packaged substrate.

5 21. A kit for use in the method of Claims 3 or 13, comprising a packaged mixture of organic solvent and aqueous solution of a strong acid, packaged buffer, packaged peroxidase enzyme and packaged substrate.

10 22. A kit according to Claims 20 or 21, wherein the buffer and the peroxidase enzyme are packaged together.

23. A kit according to Claims 20 or 21, wherein the buffer and the substrate are packaged together.

15 24. A kit according to Claims 20 or 21, wherein the buffer, the peroxidase enzyme and the substrate are packaged together.

20 25. A kit according to Claims 20 or 21, comprising a plurality of sealed ampoules each containing the peroxidase enzyme.

26. A kit according to Claim 22, comprising a plurality of sealed ampoules each containing the buffer and the peroxidase enzyme.

25 27. A kit according to Claim 24, comprising a plurality of sealed ampoules each containing the buffer, the peroxidase enzyme and the substrate.

28. A kit according to any one of Claims 20 to 27, wherein the organic solvent is acetic acid.

29. A kit according to any one of Claims 20 to 28, wherein the strong acid is aqueous sulfuric acid.

30. A kit according to any one of Claims 20-28, wherein the peroxidase enzyme is Horseradish peroxidase.

31. A kit according to any one of Claims 20 to 30, wherein the buffer is citrate/phosphate buffer.

32. A kit according to any one of Claims 20 to 31, further comprising a plurality of small open receptacles for carrying out the test therein.